

# *Sustainability Calculator*

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# Sustainability Initiatives of the Cement and Concrete Industries

# Scope

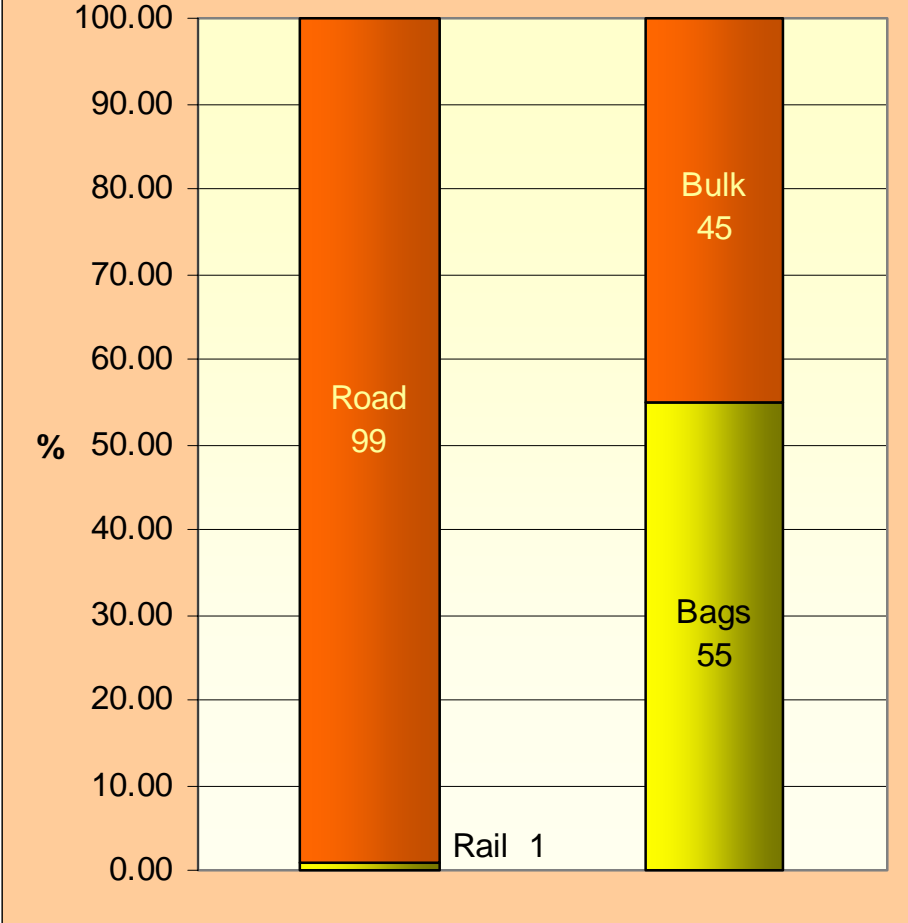
- Background
- Cement Industry
- Concrete Industry

# Background

# Background

- Cement production – 14.7 mill tons (4 producers)
- Cement consumption
  - Residential 50%
  - Non-residential 30%
  - Infrastructure 20%

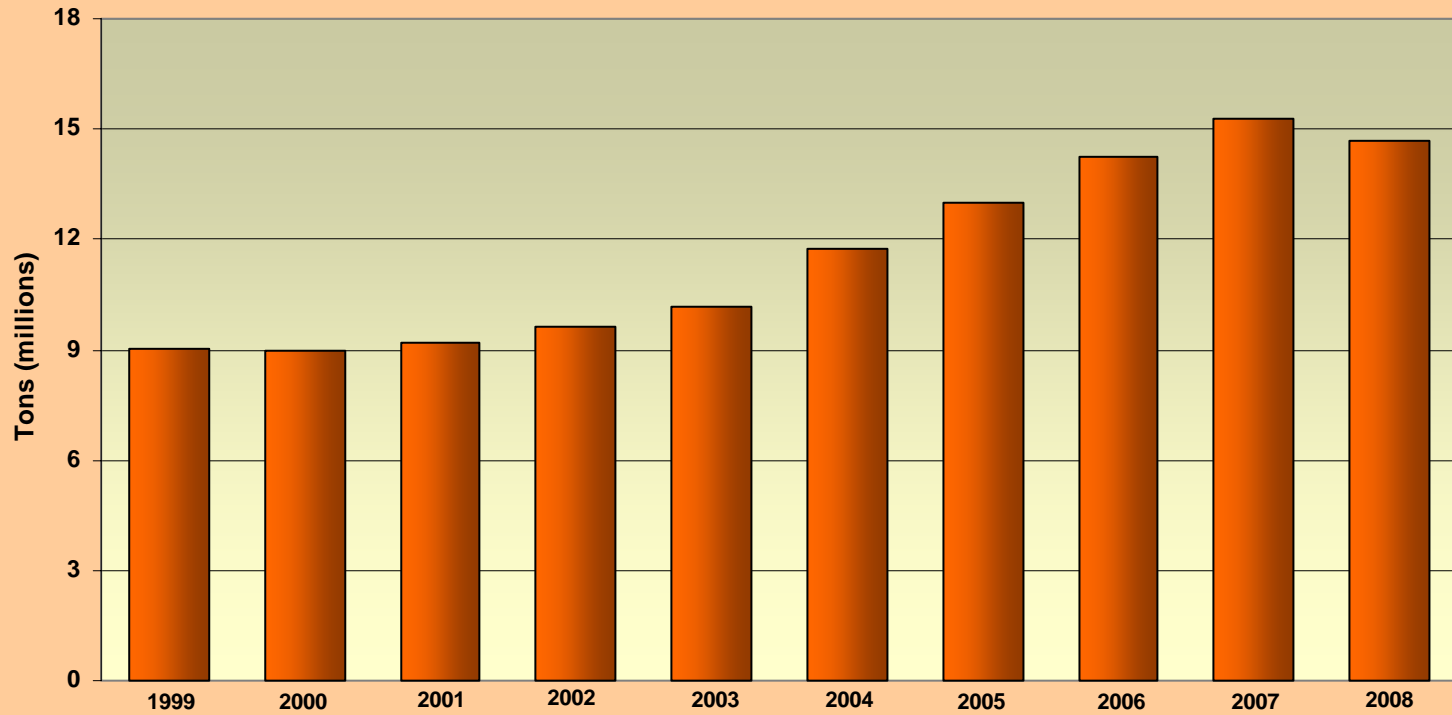
### Regional Distribution 2008



# Background cont.

- Cement consumption trends
  - Residential down, infrastructure up
  - Large infrastructure spend
- Use of extenders:
  - ggbs 1950s
  - Flyash 1980s
  - CSF 1990s

### Regional Ten Year Sales History (Cementitious binders)





# Cement Industry

# What is the Cement Industry (ACMP) doing...

- Reducing usage of raw materials
  - Use of blended cements can reduce clinker factor by 40%
  - Use of extenders such as ggbs, flyash, silica fume, ground limestone
  - Synthetic gypsum from fertilizer and sulphuric acid industries

# Cement Industry...

- Reducing energy consumption
  - Reduce use of non-renewable fossil fuels (> 1 million tpa)
  - Introduction of modern technology and equipment
  - Target reduction in energy used for mining by 15% by 2015 (>50% by end 2007)
  - Use of alternative fuels including hazardous waste and co-combustion materials

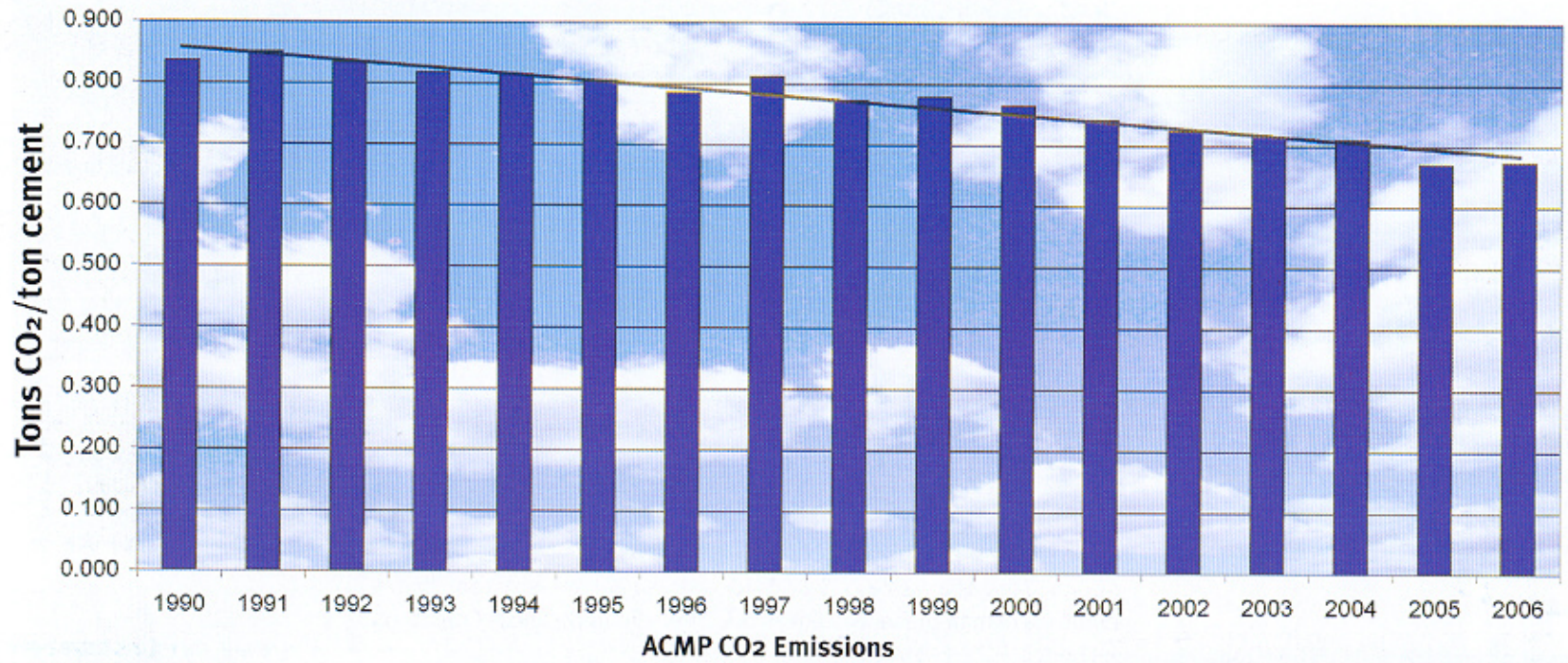
# Cement Industry...

- Reducing energy consumption (cont.)
  - Use of waste tyres in kilns
    - Coal – 96 kg CO<sub>2</sub> per GJ energy consumed
    - Tyres - 85 kg CO<sub>2</sub> per GJ energy consumed
    - Steel provides source of iron
    - No ash

# Cement Industry...

- Reducing emissions
  - Particulate emissions
    - Use of bag house filters – equivalent to world best practice
  - Greenhouse gas emissions
  - Other emissions
    - Reduced by good technology, pre-calciners, pre-heaters, etc.

## NO<sub>x</sub>



# Sustainability Initiatives of the Concrete Industry

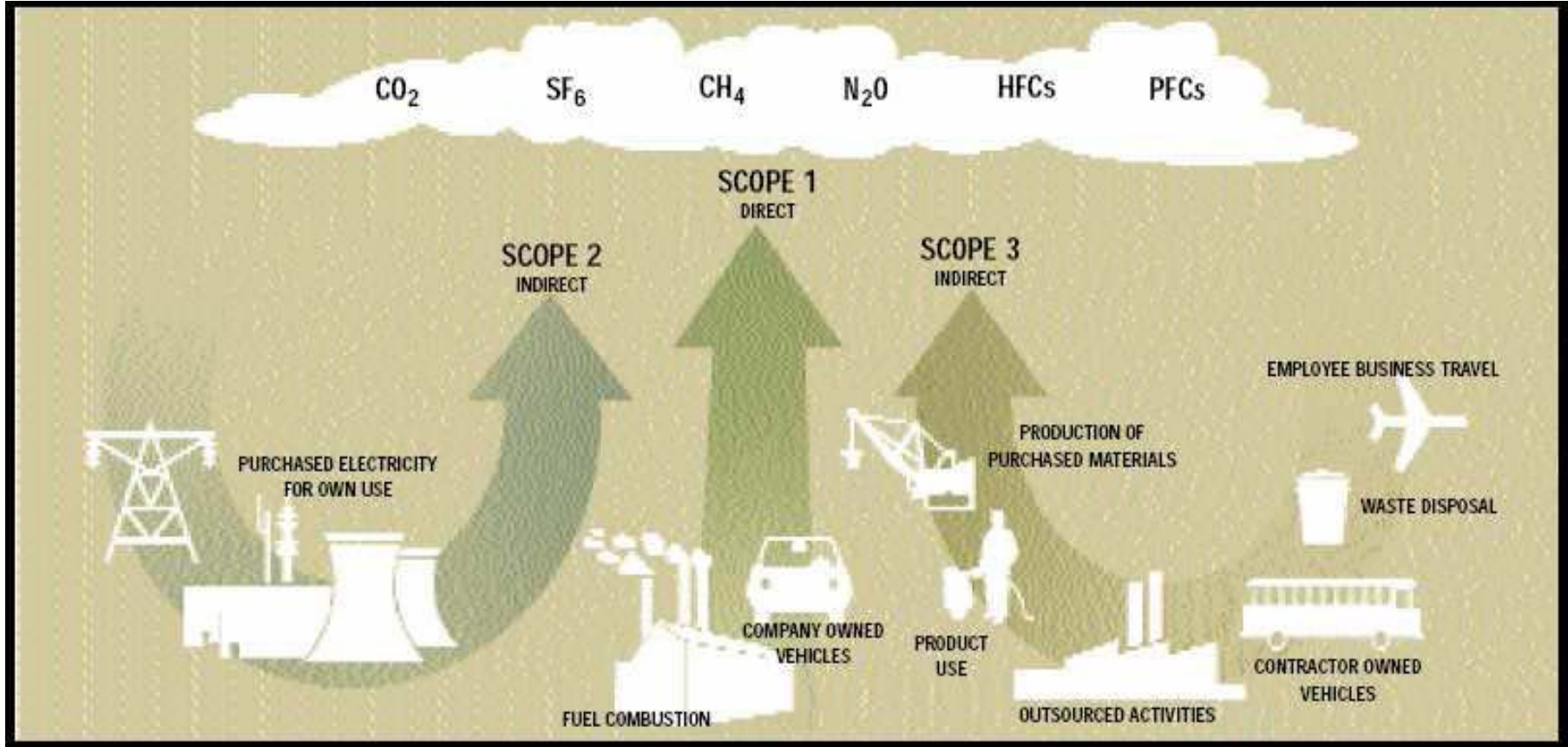
# What is the Concrete Industry (C&CI) doing...

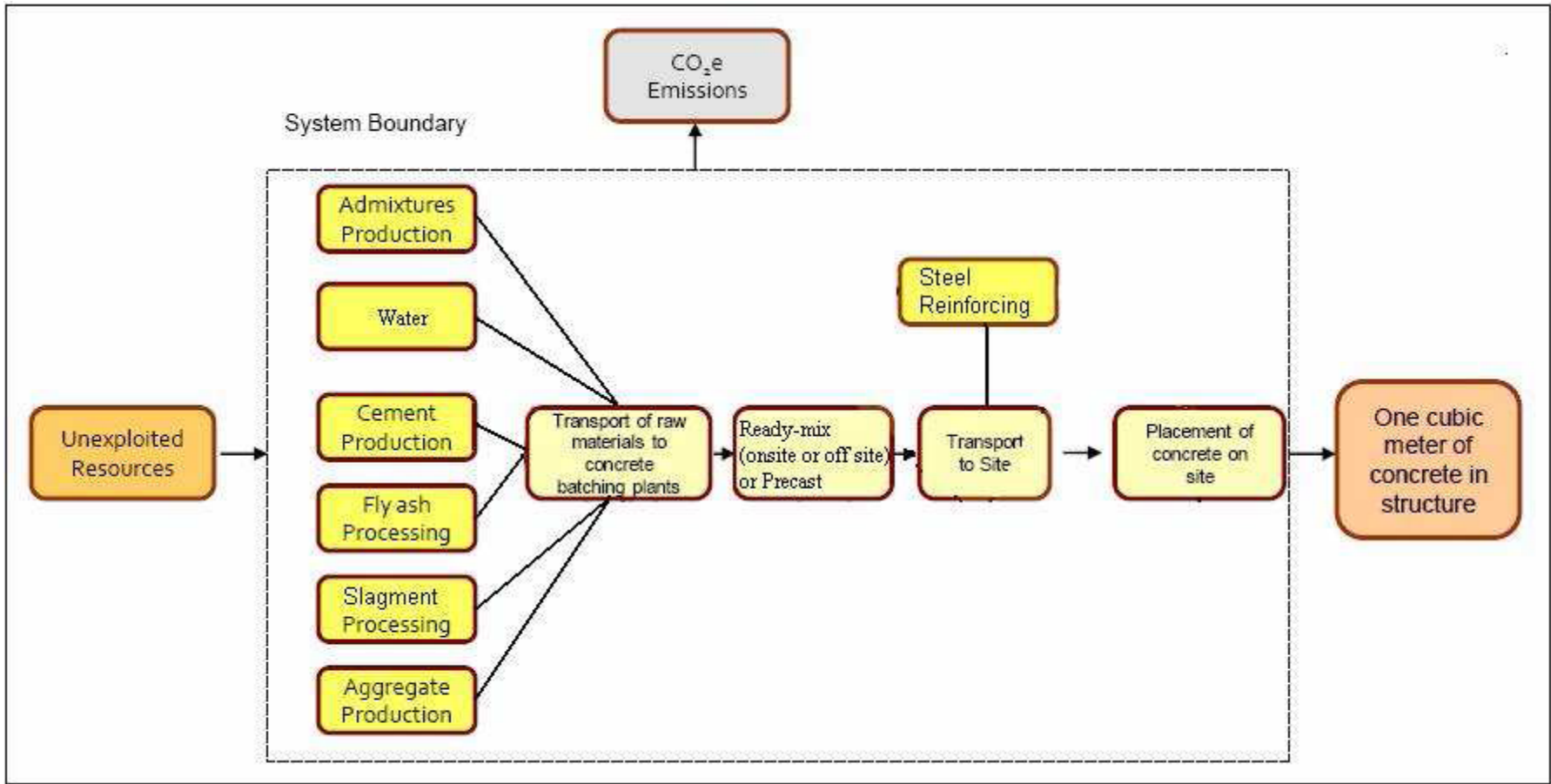
- Quantify embodied energy/CO<sub>2</sub> emissions
- Used Greenhouse Gas Protocol and WBCSD as guideline
- From cradle to gate (future cradle to grave)
- Two goals
  - Manage emissions
  - Quantify emissions

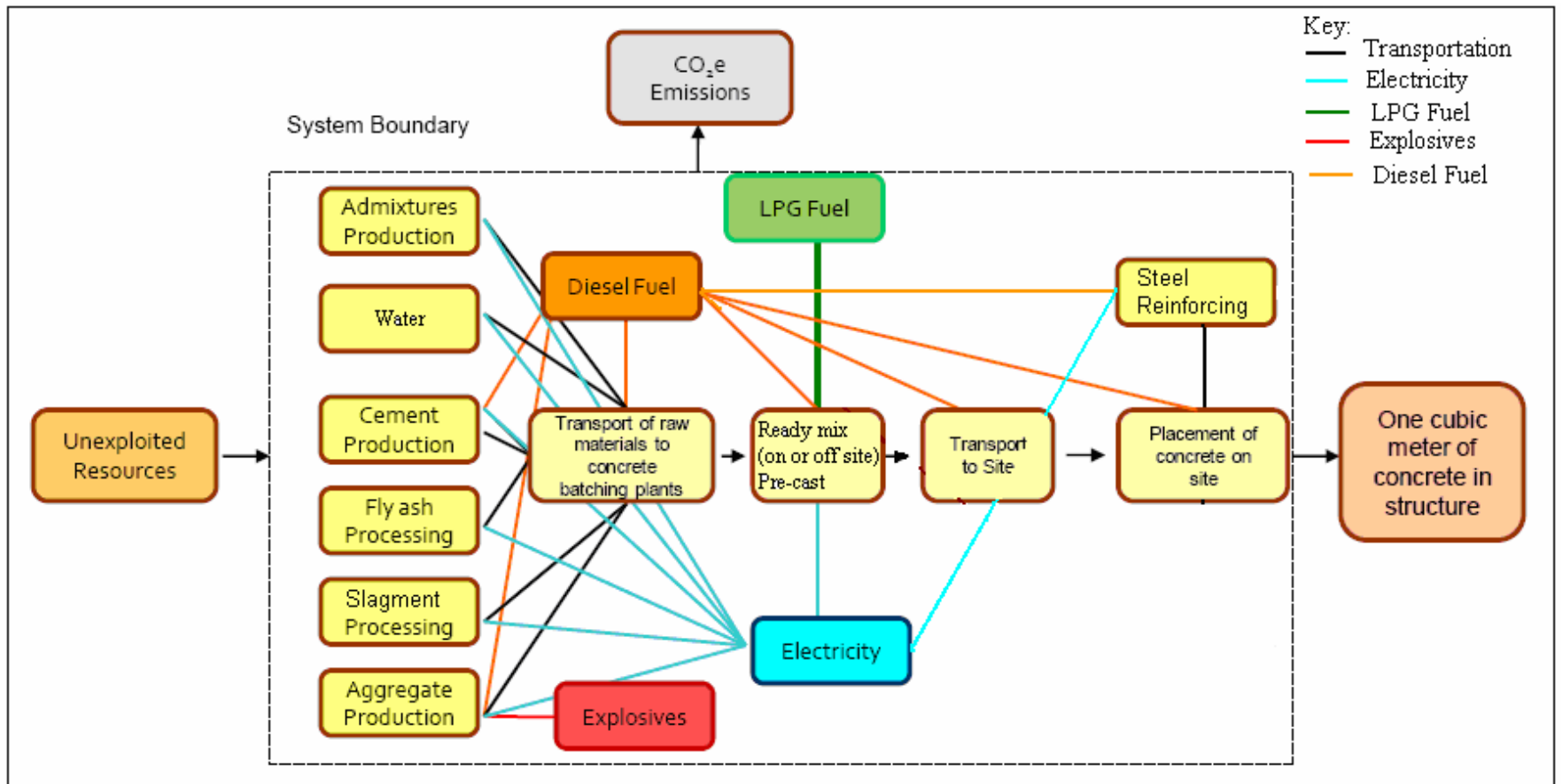


# C&CI...

- New models
  - Scope 1,2 and 3 emissions
  - Delivery transport
  - Emissions per ton







# C&C...

Sector	Respondents
Admixtures	1*
Aggregates	27
Cement	13
Flyash	3
Slagment	3
Water	1*
Reinforcement	1
Precast concrete	13
Insitu concrete/readymix	68

# C&CI...

Sector	Emission Factor
CEM I	100
CEM II A	89
CEM II B	79
CEM III A	59
CEM IV	63
CEM V	58

# C&C...

Sector	Emission Factor
Admixtures	23
Aggregates	0.55
Flyash	0.17
Slagment	14
Water	0.1
Reinforcement	287
Precast concrete	2.0
Insitu concrete	1.2

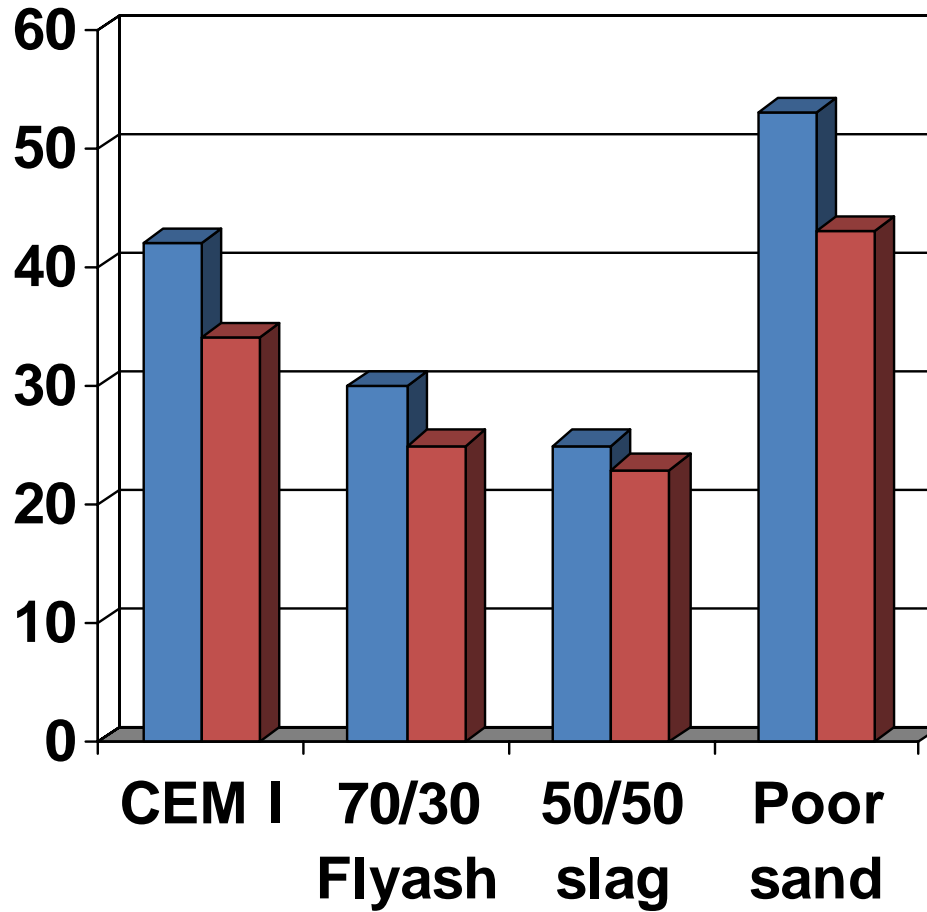
# C&CI...

- Developed concrete mixes
  - CEM I
  - 70/30 flyash
  - 50/50 slag
  - Poor sand
- All with and without admixtures



C&CI...

Models



# Conclusions

- All parts of the industry are working towards a sustainable future
- Increased use of extenders has a very positive benefit
- Now we can quantify accurately CO<sub>2</sub>e for 1 m<sup>3</sup> of concrete cast insitu or precast
- Conduct research to fill the gaps in knowledge (Fellowship for PhD at UCT)

A photograph of an elephant walking away from the camera on a paved road. The elephant's back and tail are visible. The text "Concrete is greener than you think" is overlaid in green. The background shows a blurred natural setting with trees and a clear sky.

Concrete is  
greener than you  
think



Thank you

*... for listening!*

Knowledge, ..  
.. Expertise,



**Sustainable Perfection**

